

Express Mail No. EV178023381US

PATENT APPLICATION OF

HAJA RABEONY
and
RICHARD BIAUD

ENTITLED

CHILD SEAT LINKING DEVICE IN A MOTOR
VEHICLE WITH TENSION INDICATOR, AND
CORRESPONDING CHILD SEAT

Docket No. A71.12-0005

**CHILD SEAT LINKING DEVICE IN A MOTOR
VEHICLE WITH TENSION INDICATOR, AND
CORRESPONDING CHILD SEAT**

FIELD OF THE INVENTION

5 The field of the invention is that of child care,
and more specifically that of child seats intended to
be fitted in a motor vehicle. More specifically, the
invention relates to the checking of the correct
positioning and sufficient attachment of such a seat
10 in a motor vehicle.

BACKGROUND OF THE INVENTION

For a long time, there have been various types of
child seats designed to be fitted in motor vehicles.
These child seats are most frequently attached to the
15 seat of the vehicle on which they are fitted using
the safety belt present at this point in the vehicle.

Depending on the case, this belt may act directly
on the seat, for example by circulating to the rear
of the back of said seat, in areas provided for this
20 purpose. Other types of seats have been developed,
which provide a base whereon they are attached. In
this case, this base is generally attached to the
seat of the vehicle.

Vehicle safety belts now being equipped with
25 automatic winders, a sufficient tension is generally
obtained to hold the seat in place effectively, even
in the event of sudden movement due to emergency
braking, for example. In some cases, additional
pretension systems are also provided.

Recently, it was also proposed to equip motor vehicles with fixed components, accessible between the seat base and back of the vehicle's seat, and designed to cooperate with additional components
5 provided on the child seat.

This technique is known as the "isofix" standard. It proves to be relatively advantageous in terms of easy fitting of the child seat, since it is simply necessary to latch the child seat on the
10 corresponding vehicle components without requiring the use of the safety belt which is frequently considered by users as a relatively complex operation. In addition, the attachment is effective and the risk of improper use is reduced.

15 However, it has been observed that this technique involved drawbacks, under certain conditions. Indeed, attachment is only carried out in one area, corresponding roughly to the connection between the seat base and the back of the child seat. In the
20 event of sudden braking, for example, or an impact, it is understood that the child seat may tilt forwards, sinking into the vehicle seat base, which naturally represents a significant hazard for the child.

25 Having observed this, the standardisation authorities stipulated the presence of an additional attachment point positioned in the vicinity of the upper part of the back of the seat, so as to prevent, or at least limit, this forward movement. For this, a

strap is provided, fitted on the upper part of the back of the seat, and which should be attached to the vehicle.

5 The invention also falls into the category of child seats equipped with such a device.

To guarantee the child's safety, it is of course necessary not only for the strap to be present, but also for it to be attached correctly to the vehicle and sufficiently taut to prevent the child seat from
10 moving forwards.

The invention particularly aims to provide a technique enabling users to check, easily and effectively, that such a strap is taut, and therefore that the seat is fitted correctly.

15 In other words, one of the aims of the invention is to provide such a technique, which makes it possible to ensure the safety of the child being transported, and enables the user to check easily.

Another aim of the invention is to provide such a
20 technique, which does not require costly complex means, and is easy to produce and fit.

A further aim is to provide such a technique, which is easy to use by any user, and enables an adjustment if required.

25 SUMMARY OF THE INVENTION

These aims, along with others, which will be seen more clearly below, are achieved according to the invention using a child seat linking device with a first portion of strap in a motor vehicle, comprising

two mutually moveable linking components between an idle position and a working position, adopted when said first portion of strap is taut, return means tending to return said linking components to said
5 idle position and tension indication means used to distinguish whether said linking device is in said idle position or in said working position.

In this way, it is possible to observe in a quick and reliable manner whether the seat is attached
10 correctly, with respect to this linking device, without complex or costly means.

Preferentially, a first of said linking components comprises at least one slot showing an indicator attached to the second of said linking
15 components, the appearance of said indicator being different depending on whether said linking device is in said idle position or in said working position.

In this way, in an advantageous embodiment, said indicator may shows different colours depending on
20 whether said linking device is in said idle position or in said working position. Additionally or alternatively, it may also consist of a word and/or a symbol.

According to a first embodiment of the invention,
25 one of said linking components is fitted on said seat. In this case, it may particularly be fitted in the vicinity of the upper part of the back of the seat, or the base of said seat.

According to a second embodiment of the invention, one of said moveable components is connected to said seat by a second portion of strap.

According to an advantageous characteristic of the invention, at least one of the linking components comprises means for adjusting the length of said first and/or second portions of strap.

In this case, said adjustment means may for example comprise two parallel housings wherein said portion of strap circulates.

According to a first advantageous embodiment, said return means comprise at least one spring extending parallel with the axis of movement of said mutually moveable components.

Said linking components are in this case advantageously mutually moveable in translation.

According to a first advantageous embodiment, said return means comprise at least one torsional or spiral spring.

In this case in particular, said indication means may advantageously comprise and/or cooperate with a rotationally moveable part.

According to another advantageous characteristic of the invention, said indication means may comprise at least one electrical contact.

In particular, said electrical contact(s) may act selectively on at least one luminous component, when said linking device is in one of said positions. It is also possible to provide an audible signal (which

is of course not permanent, but emitted when a change in position occurs).

The invention also relates to child seats intended to be fitted in a motor vehicle, comprising
5 or cooperating with a linking device such as that described above.

Preferentially, said linking device is then fitted in the upper part of the back of said seat or its base.

10 Advantageously, this seat also comprises attachment means to rigid components provided for this purpose in a motor vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention's other characteristics and
15 advantages will emerge upon reading the following description of a preferential embodiment, given merely as an illustrative and non-limitative example and the appended figures wherein:

- figure 1 illustrates a child seat equipped with
20 a linking device according to the invention schematically;

- figure 2 is a view of the linking device in figure 1;

- figure 3 shows the means of the device in
25 figure 2 in more detail;

- figure 4 is a sectional view of the device in figure 3;

- figure 5 illustrates, in a sectional view, another embodiment of the invention, based on a rotationally moveable component.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

5 Therefore, the invention is intended to be fitted in child seats, intended to be fitted in a motor vehicle such as that for example illustrated schematically in figure 1.

10 This seat 11 is added to a rear seat 12 of a motor vehicle and attached to said vehicle using rigid means 13 provided for this purpose, accessible between the back and seat base of the rear seat 12.

 This technique is known as "isofix" and has been standardised.

15 As already mentioned, it is observed that, while this technique is practical and ergonomic, it involves a drawback in the event of an impact or sudden braking. Indeed, in this case, the child seat tends to move forwards and downwards as illustrated
20 by the arrow 14.

 To prevent this problem, the standardising organism has provided for the presence of a strap 14, fitted on the upper part of the back of the seat 11, and planned to be attached to suitable means provided
25 for this purpose in the vehicle.

 The invention relates more specifically to this aspect. An embodiment of a linking device of the upper part of the back of the child seat with the vehicle is illustrated in figure 2. It comprises a

connection unit 21, which connects two portions of strap:

- a first portion of strap 22 connected to the back of the child seat;
- 5 - a second portion of strap 23, in this case equipped with a hook 24, intended to be attached to the vehicle. This second portion of strap is between one and two metres long, for example.

As shown in figure 3, and even more clearly in
10 the corresponding sectional view in figure 4, this connection unit consists, according to the invention, of two mutually moveable linking components 31 and 32. This mobility is of course reduced, but is designed to define two separate positions:

- 15 - an idle position, when the portions of strap 22 and 23 are not taut;

- a working position when these portions of strap are taut (if required, a minimum tension threshold may be planned to change to the working position).

20 The linking component 31 comprises a slot 33, which is used to view two separate portions of the linking component 32 depending on whether it is in the idle position or the working position.

According to a particular embodiment, each of
25 these portions 41 and 42 is assigned a different colour. For example, conventionally, in the idle position, the red portion 41 will be seen through the slot, indicating a danger to the user (in this case, that the seat is attached incorrectly). On the other

hand, if the straps are taut, the green portion 42 may be seen, indicating to the user that the fitting is correct.

Naturally, other signalling methods may be used, alternatively or in addition. The portions 41 and 42 may for example show taut and non-taut messages, respectively, or any other suitable message. Electrical signalling (luminous and/or audible) may also be provided, to indicate either one of the positions or a change from one to the other.

As seen in figure 4, return means 43 and 44 are provided between the two linking components 31 and 32. In figure 4, they consist of two springs positioned symmetrically and acting parallel with the direction of movement of the linking components with respect to each other. These springs are configured to bring the system into the idle position, in the absence of stress applied to the portions of strap.

In this way, in the idle position, the "red" indication is obtained directly and simply. When tension is applied to a portion of strap, the two linking components 31 and 32 tend to move away from each other, compressing the springs 43 and 44. The indicator then becomes "green", indicating that the straps are taut.

Advantageously, the connection means also comprise means for adjusting the length of at least one of the two portions of strap 22 and 23. In the example illustrated in figures 3 and 4, these

adjustment means conventionally consist of two parallel slots, extending perpendicular to the axis of the portion of strap 23.

In addition, the translation movement of the component 32 with respect to the component 3 may be replaced by another type of movement. It is thus possible to obtain a similar device operating rotationally, with a torsional spring. The portions indicating the idle position or working position may then be produced on a rotationally moveable part.

Figure 5 illustrates schematically, in a sectional view, an example of a device of this type.

The first portion of strap 51 is attached to a rotationally moveable component 52, for example, for a few dozen degrees. A spiral spring 53 tends to return this component 52 to its idle position. A red indicating area (for example) 54 is then positioned in front of the slot 55.

When the position of the strap 51 is sufficiently taut, this tension opposes and is greater than the return force of the spring 53. The rotationally moveable component 52 is then shifted slightly (to a stop) and the green indicating area (for example) 56 appears in front of the slot 55.

The second portion of strap, not shown, is attached by length adjustment means 57, for example, similar to those already described, formed on the component 58 which forms a housing for the rotationally moveable component 52.

According to other embodiments, if two straps are provided, it is of course possible to see strap length adjustment means for the two portions of strap, and not only for one as illustrated.

5 Finally, as already described, electrical or electronic means may be used. For example, it is possible to plan that, when the two linking components are in the working position, they close an electrical circuit, which lights up a diode. This
10 contact may also be combined with one of the springs.

Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the
15 spirit and scope of the invention.